

New species of *Xenocytaea* Berry, Beatty & Prószyński 1998 (Araneae: Salticidae) from Fiji and the Solomon Islands

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Abstract. Four new species of *Xenocytaea*: *X. stanislawi*, *X. taveuniensis*, *X. victorienis*, and *X. vonavonensis* are described from Fiji and the Solomon Islands. *X. anomala* Berry et al. 1998 is excluded from the genus. The remarks on distribution and relationships are compared with literature data.

Keywords: Taxonomy, Pacific region, spider

Over the last two decades, the salticid fauna of Southwest Pacific Islands has been the subject of intense taxonomic and biogeographical studies (Jendrzewska 1995; Berry et al. 1996, 1997, 1998; Gardzińska & Patoleta 1997, 2010; Szűts 2002, review in Żabka 2007; Patoleta 2008a, 2008b, 2009; Patoleta & Gardzińska 2010). The research has included Fiji and New Caledonia, the archipelagos being of different age, origin, biota, and distance from other faunas. Although numbers of species from both areas are quite large (44 and 22 respectively), and most of them were described at the turn of nineteenth and twentieth centuries, they are poorly documented and difficult or impossible to identify.

The current work, devoted to the genus *Xenocytaea* Berry, Beatty & Prószyński 1998, is based on new and old material and is aimed to present an updated taxonomic account of the genus.

METHODS

The studies of Fijian and New Caledonian salticid faunas have been based on a large collection of material gathered by professionals (hand collecting, fogging, light and pitfall trapping, sieving) in different periods and areas, and include over 1100 specimens from several collections (Queensland Museum, Brisbane; Muséum National d'Histoire Naturelle, Paris; American Museum of Natural History, New York; Western Australian Museum, Perth; Hungarian Natural History Museum, Budapest; Senckenberg-Museum, Frankfurt; personal collections of A. Russell-Smith and T. van Harten). To find *Xenocytaea* specimens, I have reviewed the comparative materials from the Solomons, Loyalty Island, West Samoa, Cook Island, Lord Howe, and Tonga Island. Among all of them, only 20 specimens were *Xenocytaea*. All specimens treated here are deposited in the Queensland Museum, Brisbane (QMB), except for the holotype of *X. vonavonensis*, which is deposited in the Zoologisches Museum der Humboldt-Universität, Berlin (ZMB).

The drawings were made using a grid system. Dissected epigynes were digested in 10% KOH and stained in chlorazol black E whenever necessary. Measurements are given in millimeters. The details of terminology for genitalia are illustrated in the figures. Photographs were taken with a

Canon PowerShot A620 digital camera and a compound microscope, and processed with ZoomBrowser and Helicon Focus software.

Abbreviations used: AEW – anterior eye width, a – arch (sclerotized anterior epigynal border), ag1, ag2 – accessory glands, AME – anterior median eyes, AL – abdomen length, CH – cephalothorax height, CL – cephalothorax length, c – cymbium, co – copulatory openings, CW – cephalothorax width, dta – dorsal tibial apophysis, e – embolus, EFL – eye field length, mta – middle tibial apophysis, m – metatarsus, ma – margin of the arch, p – posterior pocket, PEW – posterior eye width, sd – sperm duct, t – tibia, tg – tegulum, ta – tibial apophysis, vta – ventral tibial apophysis.

TAXONOMY

Genus *Xenocytaea* Berry, Beatty & Prószyński 1998

Type species: *Xenocytaea tiramosa* Berry, Beatty & Prószyński 1998

Diagnosis: see Berry, Beatty & Prószyński 1998:181–182.

Current list of species and their distribution: *X. daviesae* Berry, Beatty & Prószyński 1998: Viti Levu Island (Fiji)

X. maddisoni Berry, Beatty & Prószyński 1998: Viti Levu Island (Fiji)

X. stanislawi sp. n.: Viti Levu Island (Fiji)

X. taveuniensis sp. n.: Taveuni Island (Fiji)

X. tiramosa Berry, Beatty & Prószyński 1998: Viti Levu Island (Fiji)

X. victorienis sp. n.: Viti Levu Island (Fiji)

X. vonavonensis sp. n.: Vonavona Island (Solomon Islands)

X. zabkai Berry, Beatty & Prószyński 1998: Viti Levu Island (Fiji)

Excluded species: *Xenocytaea anomala* Berry, Beatty & Prószyński 1998

The species (Berry et al. 1998:186–188, figs. 116–121) differs from other representatives of *Xenocytaea* by its ventral spination on tibia I, absence of the epigynal arches, presence of tegular extension (Fig. 36, here), the course of sperm duct (Fig. 38, here), the shape of spermathecae, and insemination ducts.

KEY TO THE SPECIES OF *XENOCYTAEA*

Males

- | | |
|---|-------------------------------|
| 1. Tibia with three apophyses (Figs. 13-15) | 2 |
| Tibia with one apophysis (Figs. 16, 17) | 4 |
| 2. Median apophysis slender, the ventral one hook-like (Fig. 15) | <i>X. victoriensis</i> sp. n. |
| Median apophysis wide and short (Figs. 13, 14) | 3 |
| 3. Dorsal and the median apophyses serrated (Fig. 14), cymbium wide (Fig. 9) | <i>X. stanislawi</i> sp. n. |
| Dorsal and the median apophyses not serrated (Figs. 13, 27), cymbium tip conical (Fig. 8) | <i>X. triramosa</i> |
| 4. Tibial apophysis bicuspidate (Fig. 16) | <i>X. taveuniensis</i> sp. n. |
| Tibial apophysis not bicuspidate | 5 |
| 5. Embolic base flat (Figs. 13-16) | 6 |
| Embolic base protuberant (Fig. 17) | <i>X. vonavonensis</i> sp. n. |
| 6. Anterior part (base) of the bulbus with hook-like process (Fig. 35) | <i>X. daviesae</i> |
| Bulbus without hook-like process (Fig. 34) | <i>X. maddisoni</i> |

Females

- | | |
|---|-------------------------------|
| 1. Central pocket present (Figs. 20, 21, 31) | 3 |
| Central pocket absent | 2 |
| 2. Insemination ducts joining the spermathecae posterolaterally (Fig. 23) | <i>X. stanislawi</i> sp. n. |
| Insemination ducts joining the spermathecae laterally (Fig. 22) | <i>X. triramosa</i> |
| 3. Central pocket oriented rearwards (Fig. 39) | 4 |
| Central pocket oriented forwards (Figs. 20, 21, 40) | 6 |
| 4. Margin of the arch sinuous (Fig. 39) | <i>X. daviesae</i> |
| Margin of the arch semicircular, non-sinuous (Figs. 20, 21, 40) | 5 |
| 5. Margin of the arch widely separated from the pocket (Fig. 40) | <i>X. zabkai</i> |
| Margin of the arch lying close to the pocket (Fig. 39) | <i>X. maddisoni</i> |
| 6. Copulatory openings hidden under the arch (Fig. 20) | <i>X. victoriensis</i> sp. n. |
| Copulatory openings well visible, not hidden under the arch (Fig. 21) | <i>X. taveuniensis</i> sp. n. |

Xenocytaea stanislawi new species

Figs. 1-6, 9, 14, 19, 23, 26

Material examined.—1 male holotype, QMB S35609a, FIJI: Viti Levu, Nadarivatu Reserve, 850 m, G. Monteith & D. Cook, 25-26 July 1987; 1 female allotype, QMB S35612a, same locality, G.B. & S.R. Monteith, 11-12 July 1987; 1 male paratype, QMB S35609a, same locality, G. Monteith & D. Cook, 25-26 July 1987.

Distribution.—FIJI: Viti Levu (Fig. 41).

Etymology.—To my father Stanisław Jendrzyszewski

Diagnosis.—In comparison with *X. triramosa*, cymbium shorter and wider with flat tip, tibial apophyses longer, ventral tibial apophysis slender, dorsal and the median ones serrated, insemination ducts a little longer, joining the spermathecae posterolaterally (instead of laterally).

Description.—*Male* (Figs. 1-6, 9, 14, 26): Cephalothorax brown, with numerous whitish scales. Eye surroundings dark brown. Chelicerae brown, their frontal mid-anterior surfaces concave, promargin with 2 teeth, retromargin with single bicuspidate tooth (Fig. 3). Labium twice as long as maxillae, both light-brown. Sternum light-brown (Fig. 2). Clypeus brown, covered with grayish hairs, its height about 42% of AME diameter. Legs slender, yellowish. Tibia I slender, metatarsus and tibia with ventral fringes of black long setae (Fig. 6). Other legs not distinctive. Leg spination: mI 2-2, tI 2-2, mII 2-2, tII 2-2-2, mIII 1-2, tIII 1-2, mIV 1-2, tIV 1-1-2. Leg formula: IV-III-I-II. Abdomen whitish, with light brown pattern (Fig. 1), its ventral part whitish. Spinnerets light brown. Palpal patella and femur with ventrolateral delicate brown setae. Tibia short, with long brown and white hairs.

Bulbus wide. Embolus coiled counterclockwise, set prolaterally. Dimensions: CL 1.99, CW 1.52, CH 1.12, AL 1.69, AW 1.26, AEW 1.44, PEW 1.40, EFL 1.06.

Female (Figs. 19, 23): Cephalothorax light brown with patches of white scales at sides and near the PME and PLE. Ocular area dark brown. Chelicerae brown with round frontal surfaces, promargin with 2 teeth, retromargin with single bicuspidate tooth. Maxillae, labium and sternum light brown. Labium length 60% of maxillae length. Clypeus brown with single protruding seta, its height 32% of AME diameter. Legs yellowish, their ventral spination: mI 2-2, tI 2-2, mII 2-2, tII 2-2-2, mIII 1-2, tIII 1-2, mIV 1-2, tIV 1-0-2. Leg formula: IV-III-I-II. Abdomen light with darker pattern as in male. Spinnerets light brown. Epigyne similar to *X. triramosa*. The margin of arch a little sinuous, resembling *X. daviesae*. Copulatory openings not hidden under the sclerotized arch of epigynal border (Fig. 19). Insemination ducts a little longer than in *X. triramosa* (Fig. 23), opening more posteriorly to the globular spermathecae. Accessory glands as in Fig. 23. Dimensions: CL 2.09, CW 1.56, CH 1.30, AL 1.88, AW 1.59, AEW 1.51, PEW 1.42, EFL 1.15.

Xenocytaea victoriensis new species

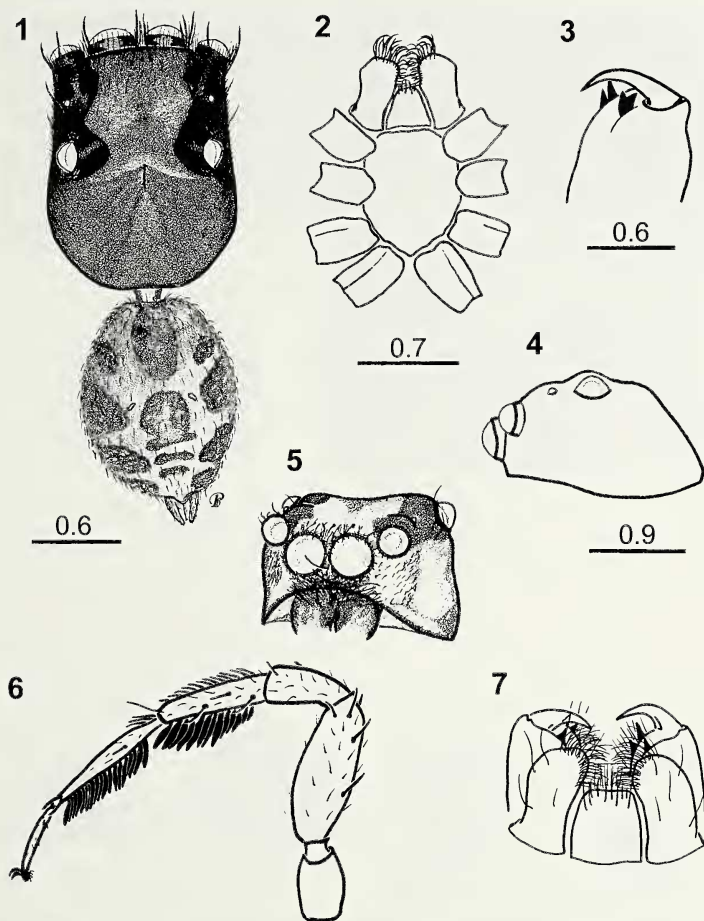
Figs. 7, 10, 15, 20, 24, 29, 30, 33

Material examined.—1 male holotype QMB S35610a, FIJI: Viti Levu, Mt. Victoria, 25 July 1987, 900 m, pyrethrum: trees and logs, G. Monteith & D. Cook; 1 female allotype QMB S35610, same data; 11 juv. same data.

Distribution.—FIJI: Viti Levu (Fig. 41).

Etymology.—From the type locality - Mt. Victoria.

Diagnosis.—Chelicerae with single, not bicuspidate tooth (Fig. 7). Tibial apophyses longer and more slender than in *X.*



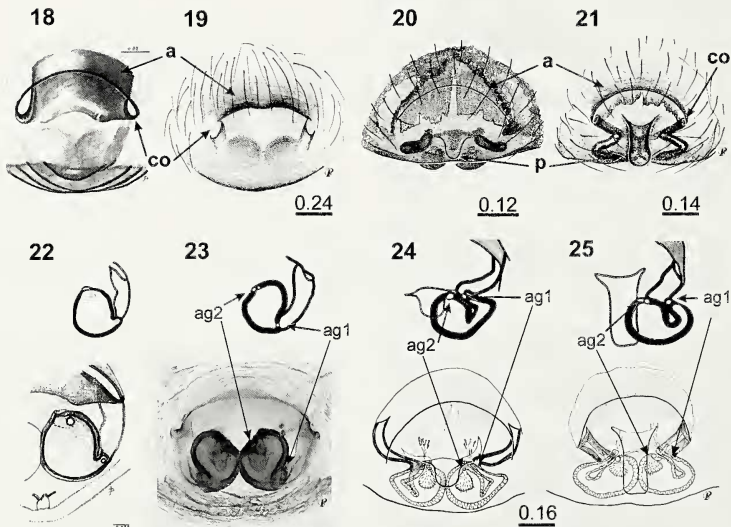
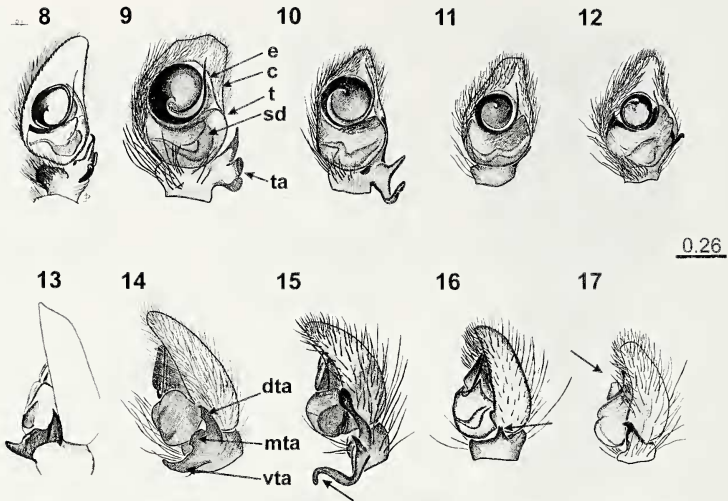
Figures 1-7. 1-6: *Xenocytaea stanislawi*, male holotype from Viti Levu (Fiji). 1. General appearance; 2. Ventral part; 3. Cheliceral dentition; 4. Lateral view; 5. Frontal view; 6. Leg I. 7.—*X. victoriensis*, male holotype from Viti Levu (Fiji), cheliceral dentition. Scale as in figures.

triramosa and *X. stanislawi* sp.n. Sclerotized arch present. Central pocket of medium depth, oriented rearwards. Copulatory openings hidden under the arch. Insemination ducts resemble *X. zabkai*, but the distal parts of spermathecae globular (instead of duct-like).

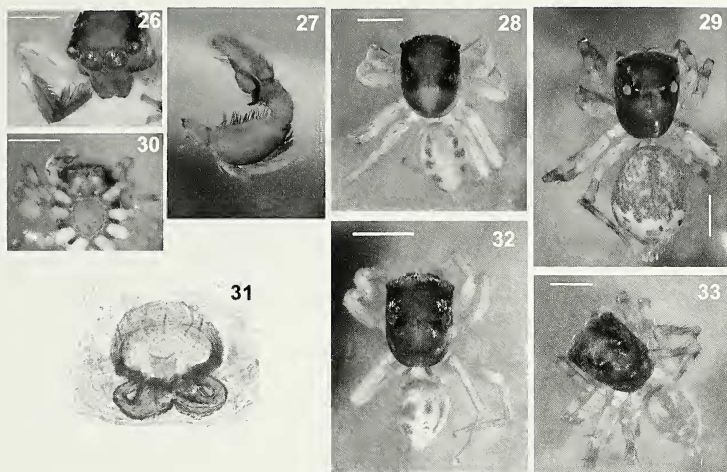
Description.—*Male* (Figs. 7, 10, 15, 30, 33): Cephalothorax dark brown with two lateral stripes of numerous whitish scales. Ocular area dark brown. Chelicerae brown. Labium length 68% of maxilla length, both gray-brown. Sternum light brown. Clypeus narrower than in *X. triramosa* and without grayish hairs, its height 35% of AME diameter. Legs gray-yellow, distally slightly darker, their ventral spination: mI 2-2, tI 1-2, mII 2-2, tII 1-0-2, mIII 2-2, tIII 2-2, mIV 1-2, tIV 1-0-2.

Leg formula: IV-III-I-II. Abdomen grayish with darker pattern similar to previous species, with white scales and some brown hairs. Venter gray. Spinnerets light brown. Palpal patella and femur without any distinctive setae, tibia short, its ventral apophysis hook-like (Fig. 15). Cymbium narrow. Embolus coiled anti-clockwise, set anterolaterally (Fig. 10). Dimensions: CL 1.75, CW 1.35, CH 1.05, AL 1.50, AW 1.25, AEW 1.40, PEW 1.25, EFL 0.85.

Female (Figs. 20, 24, 29): Cephalothorax dark brown with numerous white scales, especially at the sides and near the posterior eyes. Ocular area dark-brown. Chelicerae brown. Maxillae light brown, labium and sternum brown. Clypeus brown, its height 39% of the diameter of AME. Legs gray-



Figures 18-25. *Xenocytaea*, epigynum of allotypes: 18. *X. triramosa* (by J. Prószyński); 19. *X. stanislawi*; 20. *X. victoriensis*; 21. *X. taveuniensis*. Internal structure of epigynum (22-25): 22. *X. triramosa* (by J. Prószyński); 23. *X. stanislawi*; 24. *X. victoriensis*; 25. *X. taveuniensis*. Scale as in figures.



Figures 26-33. 26. *Xenocytaea stanislawi*, male holotype, frontal view; 27. *X. triramosa*, male palp, lateral view; 28. *X. taveuniensis*, male holotype, dorsal view; 29. *X. victoriensis*, female allotype, dorsal view; 30. *X. victoriensis* ventral view; 31. *X. taveuniensis*, epigynum. 32. *X. vovavonensis*, male dorsal view; 33. *X. victoriensis*, male holotype, dorsal view. Scale 1.00mm.

yellow, slightly darker distally, their ventral spination: mI 2-2, tI 2-2, mII 2-2, tII 1-0-2, mIII 2-2, tIII 1-2, mIV 2-2, tIV 1-0-2. Leg formula: IV-III-1-II. Abdomen and venter gray with light spots (Fig. 29). Spinnerets brownish. Epigyne with sclerotized arch, its anterior border similar to *X. zakkai* (Fig. 24). Posterior pocket like in *X. daviesae*, but orientated rearwards. Insemination ducts long, S-shaped. Proximal parts of sper-

mathecae duct-like, distal ones globular. Accessory glands as in Fig. 24. Dimensions: CL 1.86, CW 1.38, CH 1.20, AL 2.28, AW 1.80, AEW 1.44, PEW 1.26, EFL 0.90.

Xenocytaea taveuniensis new species

Figs. 11, 16, 21, 25, 28, 31

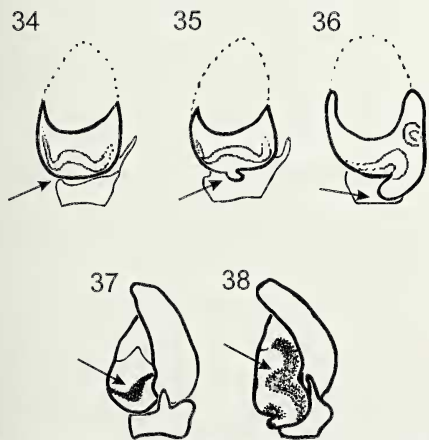
Material examined.—1 male *holotype*, QMB S35598, FIJI: Taveuni, L. Tagimaucia track, 15 July 1987, 500-600 m, coll. G. Monteith & D. Cook. 1 female *allotype*, QMB S35586, Fiji: Taveuni, L. Tagimaucia track, 16°48'S, 179°57'W, 800 m, rainforest, litter, moss, coll. G. Monteith & D. Cook, 15 July 1987.

Distribution.—FIJI: Taveuni (Fig. 41).

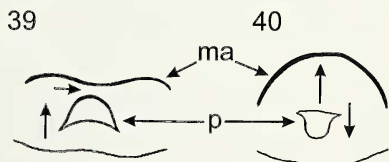
Etymology.—From the type locality - Taveuni Island.

Diagnosis.—In comparison to closely related *X. maddisoni*, tibial apophysis bicuspidate, not hooked (Fig. 16) and embolus set anterolaterally. Copulatory openings not covered by the arch. Posterior pocket deep. Insemination ducts short and wide.

Description.—*Male* (Figs. 11, 16, 28): Cephalothorax brown with light brown sides, covered with white scales forming lateral stripes. Eye field dark brown. Chelicerae brown



Figures 34-38. Schematic drawings of the male palp showing tegulum shape and sperm duct (34-36), hook-like process (35), retro-lateral proximal extension (36) and sperm duct making retro-lateral loop (38).



Figures 39, 40. Schematic drawings of the epigyne, showing the shape of anterior epigynal border, its orientation and position.

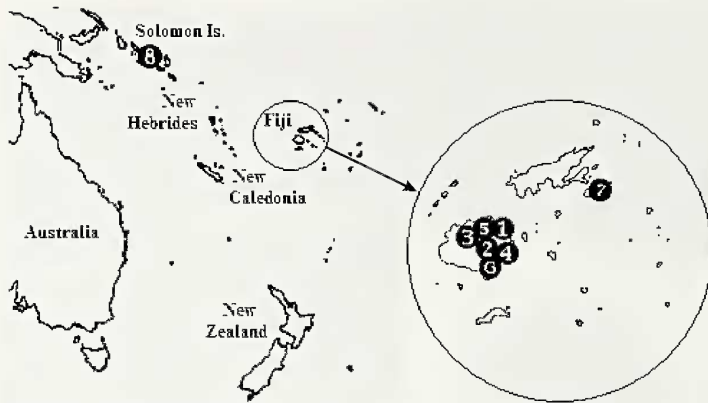


Figure 41. Geographical distribution of the genus *Xenocytaea*.

1 *X. daviesae*, 2 *X. maddisoni*, 3 *X. stanislawi*, 4 *X. tiramosa*, 5 *X. victoriensis*, 6 *X. zabkai*, 7 *X. tavuimensis*, 8 *X. vonavonensis*.

retromargin with single bicuspidate tooth, promargin with 2 teeth. Maxillae and sternum yellow, labium gray-yellow, its length 60% of maxillae. Clypeus yellow, height 29% of the AME diameter. Legs whitish, their ventral spination: mI 2-2, tI 0-0, mII 2-2, tII 0-0-0, mIII 2-2, tIII 1-2, mIV 1-2, tIV 1-0-2. First metatarsus, tibia, patella and femur darker posterolaterally. Leg formula: IV-III-I-II. Abdomen gray-yellow with darker pattern (Fig. 28). Venter whitish. Spinnerets light brown. Palpal tibial apophysis simple (Figs. 11, 16). Cymbium narrow. Embolus coiled anti-clockwise. Sperm duct wavy. Dimensions: CL 1.96, CW 1.32, CH 1.08, AL 1.56, AW 1.00, AEW 1.28, PEW 1.20, EFL 0.92.

Female (Figs. 21, 25, 31): Cephalothorax brown, covered with numerous white scales. Eye field dark brown. Chelicerae with 2 promarginal teeth and retromarginal bicuspidate tooth. Maxillae and sternum yellow, labium brown. Clypeus height 46% diameter of AME. Legs light brown, distally darker, their ventral spination: mI 2-2, tI 1-2, mII 2-2, tII 1-0-2, mIII 2-2, tIII 1-2, mIV 2-2, tIV 1-0-2. Leg formula: IV-III-I-II. Abdomen gray-yellow with dark spots and transverse light strip. Venter whitish. Spinnerets brown. Epigynal pocket deep, located posteriorly and oriented rearward. Copulatory openings not hidden under the arch. Insemination ducts long, S-shaped, resembling *X. victoriensis* but wider. Proximal parts of spermathecae duct-like, distal ones globular. Accessory glands as in Fig. 25. Dimensions: CL 1.95, CW 1.55, CH 1.15, AL 2.05, AW 1.65, AEW 1.40, PEW 1.35, EFL 0.80.

Xenocytaea vonavonensis new species

Figs. 12, 17, 32

Material examined.—1 male *holotype*, SOLOMON IS.: Vonavona Is., A. van Harten, 24 Jan 1995, ZMB.

Distribution.—SOLOMON IS.: Vonavona Is. (Fig. 41).

Etymology.—From Vonavona Island, where the material was found.

Diagnosis.—Cephalothorax and abdomen with patches of iridescent scales. Embolic base protuberant. Tibial apophysis

simple, resembling *X. daviesae* and *X. maddisoni*, but strongly hook-like.

Description.—**Male** (Figs. 12, 17, 32): Cephalothorax dark brown with numerous iridescent scales on sides and near the eyes, eye surroundings black. Chelicerae brown, promargin with 2 teeth, retromargin with single bicuspidate tooth. Maxillae, labium, and sternum brown. Labium length 60% of maxillae length. Clypeus brown, its height 26% of AME diameter. Legs whitish, femur I and II and coxae III and IV darker postero-retrolaterally, their ventral spination: mI 2-2, tI 2-2-2, mII 2-2, tII 0-0-0, mIII 2-2, tIII 1-2, mIV 1-2, tIV 1-0-2. Leg formula: IV-III-I-II. Dorsal and ventral abdomen whitish with gray-brown spots and iridescent scales. Spinnerets yellowish. Palpal organ as in Figs. 12, 17. Cymbium narrow, tibial apophysis simple, resembling *X. daviesae* and *X. maddisoni*, but in lateral view strongly hooked. Embolus set anterolaterally. Dimensions: CL 1.38, CW 1.03, CH 0.86, AL 0.98, AW 0.74, AEW 1.06, PEW 0.97, EFL 0.70.

Female: Unknown.

Xenocytaea tiramosa Berry, Beatty & Prószyński 1998

Figs. 8, 13, 18, 22, 27

Material examined.—1 male, FIJI: Viti Levu, Colo I-Suva, Forest Park, A. van Harten, 23–27 Aug. 1995, ZMB.

Distribution.—FIJI: Viti Levu (Fig. 41).

REMARKS ON RELATIONSHIPS

Berry et al. (1998) suggest *Xenocytaea* relationships with *Cytaea*, *Chalcotropis*, *Donoessus* and *Panyssinus*. The comparison of male genitalic characters supports *Cytaea* to be related; however, female genitalia are completely different. It seems that in order to determine the precise generic relationships, it is necessary both to use molecular data and to identify the outgroup for *Xenocytaea*.

The genitalic characters within *Xenocytaea* show distinctive variation in tibial apophyses, epigynal arch and pocket, spermathecae and insemination ducts. The simplest palpal

organ is found in *X. maddisoni* and *daviesae*, where the tibial apophysis is single. *X. triramosa*, *X. stanislawi*, and *X. victoriensis* have three apophyses; unfortunately, there is no obvious correlation between male and female genital characters. Also, at this stage, there is no distinctive connection between characters of particular species and their distribution to show the evolutionary tendencies and distributional history of the genus.

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